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CTN Test Report
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Technical Publication Transfer Test with Texas Instruments: MIL-M-28001 (SGML) and MIL-D-28000 Class I (IGES)

Quick Short Test Report

September 18, 1990



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Prepared for
Air Force Logistics Command



Lawrence Livermore National Laboratory

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Technical Publication Transfer Test with Texas Instruments: MIL-M-28001 (SGML) and MIL-D-28000 Class I (IGES)

Quick Short Test Report

September 18, 1990

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1 Introduction

1.1 Background

The DoD Computer-aided Acquisition and Logistic Support (CALS) Test Network (CTN) is conducting tests of the military standard for the Automated Interchange of Technical Information, MIL-STD-1840A, and its companion suite of military specifications. The CTN is a DoD-sponsored confederation of voluntary participants from industry and government managed by the Air Force Logistics Command.

The primary objective of the CTN is to evaluate the effectiveness of the CALS standards (Standards) for technical data interchange and to demonstrate the technical capabilities and operational suitability of those Standards. Two general categories of tests are performed to evaluate the Standards, formal and informal. Formal tests are large, comprehensive tests that follow a written test plan, require specific authorization from DoD, and may take months to prepare, execute, and report.

Informal tests are quick and short, taking only a few hours to set up and execute. They are used by the CTN technical staff to broaden the testing base by including representative samples of the many systems and applications used by CTN participants. They also allow the CTN staff to gain feedback from many industry and government interpretations of the Standards, to increase the base of participation in the CALS initiative, and to respond, in a timely manner, to the many requests for help that come from participants. Participants take part voluntarily and are benefited by receiving an evaluation of their latest implementation (interpretation) of the Standards, interacting with the CTN technical staff, gaining experience in use of the Standards, and developing increased confidence in them. The results of informal tests are reported in Quick Short Test Reports (QSTRs) that briefly summarize the standard(s) tested, the hardware and software used, the nature of the test, and the results.

1.2 Purpose

The purpose of the informal test reported in this QSTR was to analyze Texas Instrument's (TI's) interpretation and use of the CALS standards in transferring technical publications data. TI produced data in accordance with the Standards and delivered it to the CTN technical staff on a 9-track magnetic tape.

2 Test Parameters

Test Plan: CTN89-TM-ED-21

Date of Evaluation: January 30, 1990

Evaluators: Lawrence Livermore National Laboratory
P.O. Box 808, L-542
Livermore, CA 94550

Syscon Corporation
3990 Sherman Street
San Diego, CA 92110

Data Originator: Texas Instruments, Inc.
6500 Chase Oaks Boulevard
P.O. Box 869305
Plano, TX 75086

Data Description: Technical Manual T.O. 33D7-44-318-1 containing:

1 document declaration file
10 SGML instance files
17 IGES files

Data Source System:

Text/SGML	Sun Workstation 386i with Shaffstall 6000 Converter and SGML Software Dated 12-15-89
IGES	InterCAP Graphics Systems IGES Translator Version 7.5A04

Evaluation Tools Used:

1840A	CTN TAPEVAL
SGML	Datalogics Inc., Instance Parser
IGES	IGES Data Analysis, Inc. Parser/Verify Rosetta Technologies, Inc. PreVIEW

Standards Tested: MIL-STD-1840A Notice 1 (1840A)
MIL-M-28001 (28001)
MIL-D-28000 Amendment 1 (28000) Class I

3 1840A Analysis

3.1 External Packaging

The submittal from TI met most of 1840A's external packaging requirements except one. The packaging did not contain a printed listing of the declaration file. This requirement helps the receiving site know the content of the tape. Respectfully, TI did meet one particular requirement quite well. This condition called for the company to label the box with a warning sticker as shown in 1840A. The TI participants confessed that, although they met the requirement, it was not easy. The special stickers are available, but in many instances are difficult to find. Thus for this test, TI crafted a special sticker to match the warning label in 1840A. The sticker even matched the requirement of red letters on a white background. While pointing to an ambiguity in 1840A, TI asked if all that work was necessary. The standard is unclear whether it requires that exact warning label or just one similar to it. After further study of the intent of 1840A, the CTN recommends a change to the standard. It should more clearly state that the packaging need display only a similar warning label to the one shown.

3.2 Transmission Envelope

3.2.1 Tape Formats

TI copied all files to tape at the correct 1840A-required formats, record lengths, and block sizes. The tape label and density were also correct.

3.2.2 Declaration Files and Header Fields

The 1840A declaration file and all header fields were correct.

4 SGML Analysis

TI's generation of the SGML data was apparently automatic in several respects. The bulk of these errors made it impossible to parse the instance as one file. The software tagged each component of the document as if it were an entire document. Some parsers require this to parse a partial document since they cannot start parsing from any point except at the beginning of a document. Documents, however, cannot be transmitted in such a manner. Each component must be a direct continuation of the previous component.

Some errors were detected during an inspection of the SGML. The Safety Summary and Foreword were coded as sections when they should have been "<SAFESUM>" and "<FOREWORD>" respectively. The Table of Contents and the List of Effective Pages should be empty according to the 28001 Conforming DTD. The SGML on this tape had these items fully tagged. One of the SGML comments was missing its left angle bracket ("<"). Section 6 contained all of the foldouts and hence should have been a Foldout Section ("<FOLDSECT>") in the rear matter of the document.

5 IGES Analysis

In general, the IGES files correctly transmitted the illustrations, yet several graphical and conformance issues existed. Out of the seventeen IGES files that TI submitted, the CTN analyzed six.

The largest of the six files was corrupt. The data stopped 200 or so lines short of the end of the file. This glitch created a file the CTN was unable to analyze. TI speculates that the computer operator lost the last lines of data while editing the file. This hand editing was necessary because 28000 requires that the user enter certain information into the Start Section of all IGES files. Many Computer Aided Design (CAD) systems prompt the user for this information during the pre-processing stage, however, TI's system did not.

The remaining five files portrayed the graphics well, however, they did not meet all of the 28000 Class I requirements. All files contained IGES Text Fonts 2 and 17 (without Intercharacter Spacing Entities) instead of Font 1 as allowed. Furthermore, all were missing the CALS required Drawing and View Entities. One file contained Point Entities not permitted by 28000 Class I. These problems were due to the CAD vendor's unfamiliarity with the strict requirements of 28000 Class I. The CTN has alerted TI's CAD system vendor, InterCAP, to all these issues. The company plans to address them in the next software release.

One of 28000's requirements brought forward an important comment from InterCAP. The IGES software developer asked, "Since the Point is not a Class I entity, how should InterCAP pre-process one if the user creates one?" Should translators throw away the Point or pre-process it into another entity? This applies to more complex entities as well. If the drafter created a Dimension and wishes to create a Class I conforming file, into what entities should the software decompose the Dimension (into Lines and Text, Copious Data, etc.)? This problem brings to light the need for decomposition mappings in 28000. Decomposition mappings will help vendors represent their complex entities with entities allowed in the subset. Instead of decomposition mappings, application protocols might also achieve the end goal of more unambiguous and successful data exchange.

On the appearance of the graphics, the CTN found minor inconsistencies between the original illustrations and the ones processed through IGES. For example, the translator produced IGES files containing incorrectly represented reverse graphic lines. Also, the files contained unfilled arrowheads when TI originally illustrated filled arrowheads. Additionally, they contained some misrepresented symbol characters. Most of these problems are due to TI's use of an older version of the InterCAP IGES processor.

One symbol character in particular, the ohm symbol, did not transfer at all. The cause of this problem is that the IGES specification itself does not contain a text font that translates ohm symbols in illustrations. The CTN has notified the IGES/PDES Organization of this limitation.

Finally, two files had graphical problems attributed to the illustrators at TI. The illustrators neglected to delete and purge the publication stamp before pre-processing each image. This caused the publication stamp, even though it may have been blanked, to appear in the IGES file.

6 Conclusions and Recommendations

In conclusion, the TI technical publication test was successful. The CTN recommends that:

1. 1840A should contain a clearer statement that the packaging may display a warning label of any style as long as it calls attention to the delicate content of the package.
2. 28000's subsets should contain not only lists of entities, but also decomposition mappings. As an alternative solution, application protocols should replace the subsets in 28000.
3. IGES and 28000 should allow the processing of the ohm symbol in illustrations.
4. TI should attach printed listings of the declaration files to the packing slips of future CALS deliverables.
5. TI should analyze the product that generates its SGML files for transmission. It is treating each component as a separate document with respect to the MIL-M-28001 Conforming DTD. Elements declared to have no content in the DTD should not have content during transmission. Elements erroneously treated as sections of the body should be tagged and placed according to their application.
6. TI should be sure to delete and purge all publication stamps from the illustrations before pre-processing the graphics into IGES files. Furthermore, TI should ask its CAD vendor to allow user defined Start Sections and to meet more of 28000's requirements.